

Search and learn
First term

Unit 1 : Matter

Lesson 1: Measuring Tools

Matter:

It is anything that has mass and volume.

Or

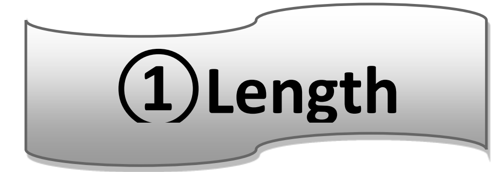
It is anything that has mass and occupied by the body.

Mass:

It is the amount of matter in an object.

Volume:

It is a part of space occupied by the body.



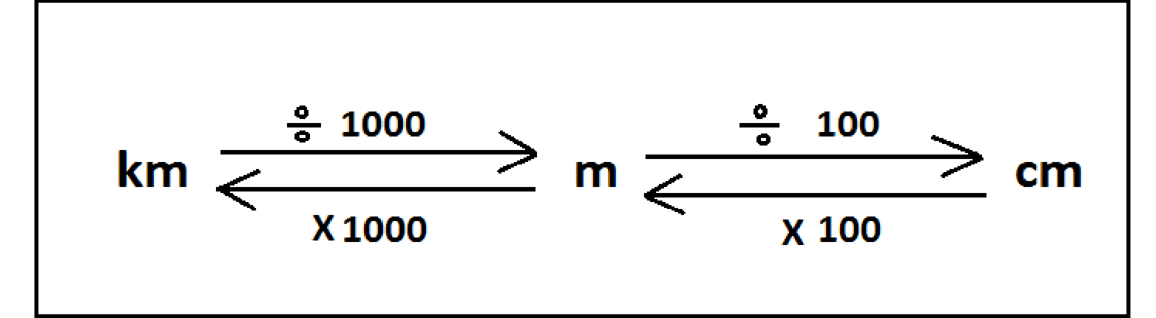
Measuring tools:

1. ***Measuring ruler:*** for short length like the length of book.
2. ***Graduated tape:*** for long length like the length of the class room.

Measuring units:

1. ***Centimeter (cm):*** for short length like the length of your pencil.
2. ***Meter (m):*** for long length like dimensions of room sides.
3. ***Kilometer (km):*** for very long length like distances between cities.

Where,



1 kilometer = 1000 m.

1 meter = 100 centimeter.



Measuring tools:

1. ***Sensitive balance:*** for small masses like gold, jewelry and chemicals.
2. ***Common balance:*** for large masses like fruits and vegetables.

Measuring units:

1. ***Gram(g):*** for small masses like jewelry
2. ***Kilogram (kg):*** for large masses like fruits
3. ***Ton:*** for very large masses like metals.

Where,

Ton	÷ 1000 → / ← X 1000	Kg	÷ 1000 → / ← X 1000	g

1 Ton = 1000 kg.

1 kg = 1000 g



Measuring tools:

1. ***Graduated cylinder:*** to measure the volume of liquids and the volume of irregular solids like water and marble stones.
2. ***Measuring ruler or graduated tape:*** to measure the volume of regular solids like cubes.

Measuring units:

1. Milliliter (mL)
2. Liter (L)

} To measure the volume of liquids only.

3. Cubic centimeter (cm)
4. Cubic meter (m^3)

} To measure the volumes of both solid and liquids

Where, 1 liter = 1000 cm^3

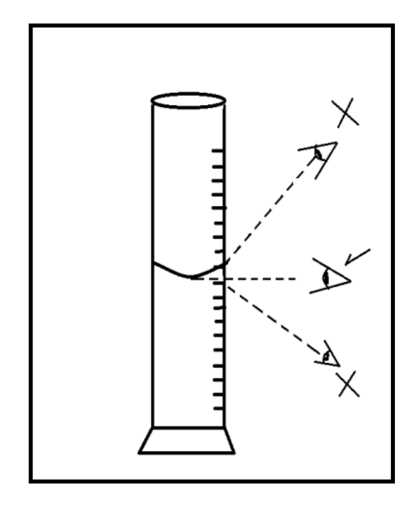
1 liter = 1000 ml

1 cm^3 = 1 ml

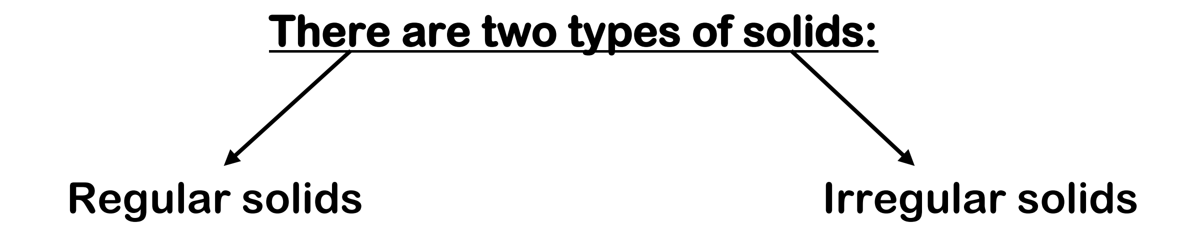
Methods of measuring volume:

Estimating the volume of liquids:

1. Fill the graduated cylinder with an amount of liquid (water).
2. Record the reading of the volume of the lower level of the liquid surface.



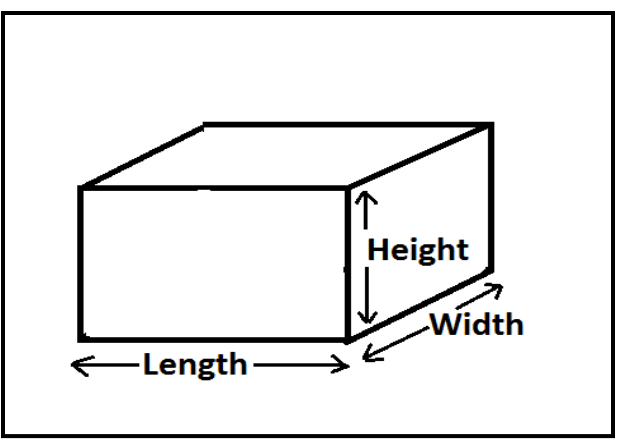
Estimating the volume of solids:



①Estimating the volume of regular solids:

By using the following law we can find the volume of regular solids

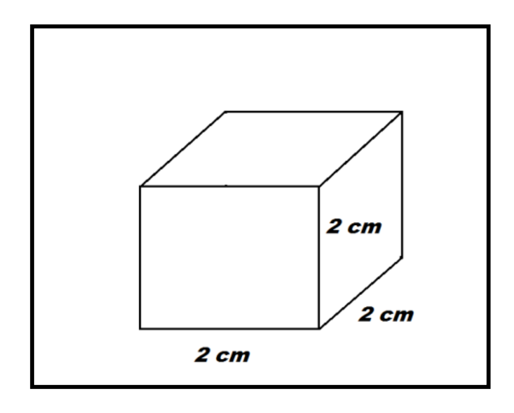
Volume of regular solids = Length X Width X Height



Ex.: Find the volume of cubic box if its side's length is 2cm.

Volume = length X width X height

Volume = 2 X 2 X 2 = 8 cm^3



②Estimating the volume of irregular solids:

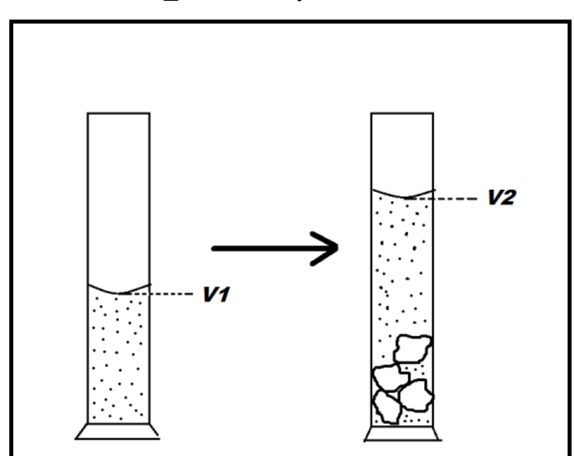
The graduated cylinder is used to measure the volume of irregular shaped objects

Volume of irregular solids = V_2 - V_1

Where,

V_1 is the volume of liquid only.

V_2 is the volume of liquid and the irregular solid objects.



Ex.: If 5 iron pieces of equal volumes were put in a graduated cylinder filled with 20cm^3 of water, then the water rise up to 80 cm^3. Find the volume of each piece.

Answer:

V1 = 20 cm^3 V2 = 80 cm^3

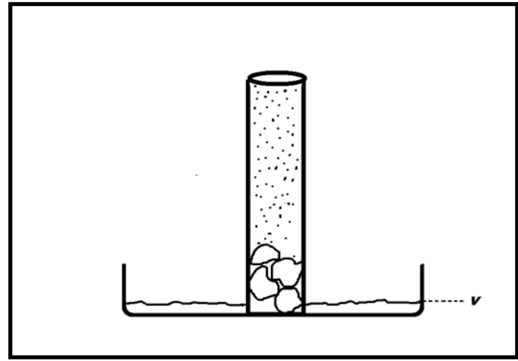
Volume of all iron pieces = $V_2 - V_1$ = 80 – 20 = 60 cm^3

The volume of each piece = $\frac{60}{5}$ = 12 cm^3

Note:

When a body is submerged completely in a cylinder full of water, then the water is spilled out. So,

The volume of the body = the volume of spilled water.



The relation between mass and volume of matter:

- ❖ **Equal volumes of different materials have different masses.**
- ❖ **Equal masses of different materials have different volumes.**

i.e. : one kilogram of water is equal in its mass with one kilogram of iron, but the volume of one kilogram of water is bigger than one kilogram of iron.

Worksheet

Q.(1): Complete:

1. Common balance is used for measuring ....
2. Length can be measured by some units as ....and ....
3. A matter has ....and.............
4. Equal volume of different materials have different ....
5. Kilogram = ...gram.
6. Meter is the unit of measuring ....

Q.(2): Choose the correct answer:

1. The volume of a solid material is measured by ....
   (cm - cm^2 - cm^3 - meter)
2. We can determine the volume of irregular shaped small stone that doesn't dissolve in water by using ....
   (glass beaker - measuring cylinder - common balance - graduated ruler)
3. Jewelries masses are measured by using ....
   (graduated tape - sensitive balance - ruler - cylinder)
4. 1 meter = ...centimeter
   (10 - 100 - 1000)

Q.(3): Problems:

1. A pupil placed 4 marbles of equal volume in a 100 cm^3 graduated cylinder containing water. The water level rose up to 120 cm^3. Calculate the volume of each marble.
   ....
   ....
   ....

2. **If your class mate placed a piece of iron into 50 cm ^{3} beaker filled completely with water, a quantity of water of volume 20 cm ^{3} is poured out of the beaker. Calculate the volume of iron piece.**

   ………………………………………………………………………………
   ………………………………………………………………………………
   ………………………………………………………………………………

3. **A stone is put inside a jar containing 30 cm3 of water. Water level raised up to 50 cm3. Calculate the volume of the stone.**

   ………………………………………………………………………………
   ………………………………………………………………………………
   ………………………………………………………………………………

Home work

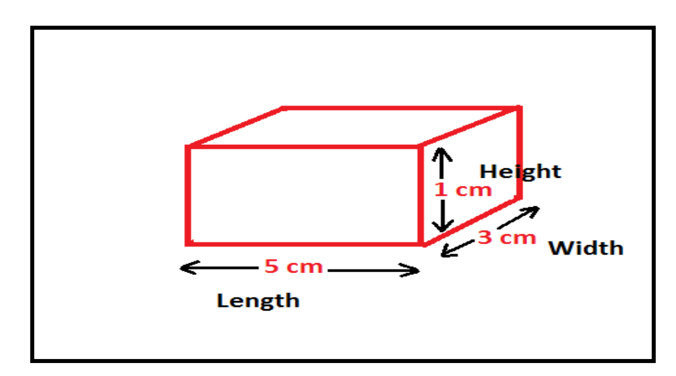
Q.(1): Complete:

1. Measuring ruler is used in measuring……………….
2. The space occupied by a cube with one meter side equals ………
3. Kilogram is the unit of measuring ……………………
4. 1 liter = …………milliliter.
5. Measuring tape is used in measuring …………………

Q.(2): Choose:

1. Volume of cuboids = ……………………..
   (length + width + height - length X width X height)
2. If the dimension of your book is 5 cm, 2 cm and 2cm, so the volume of this book is ………………..
   (30 - 20 - 10)

Q.(3): Calculate:

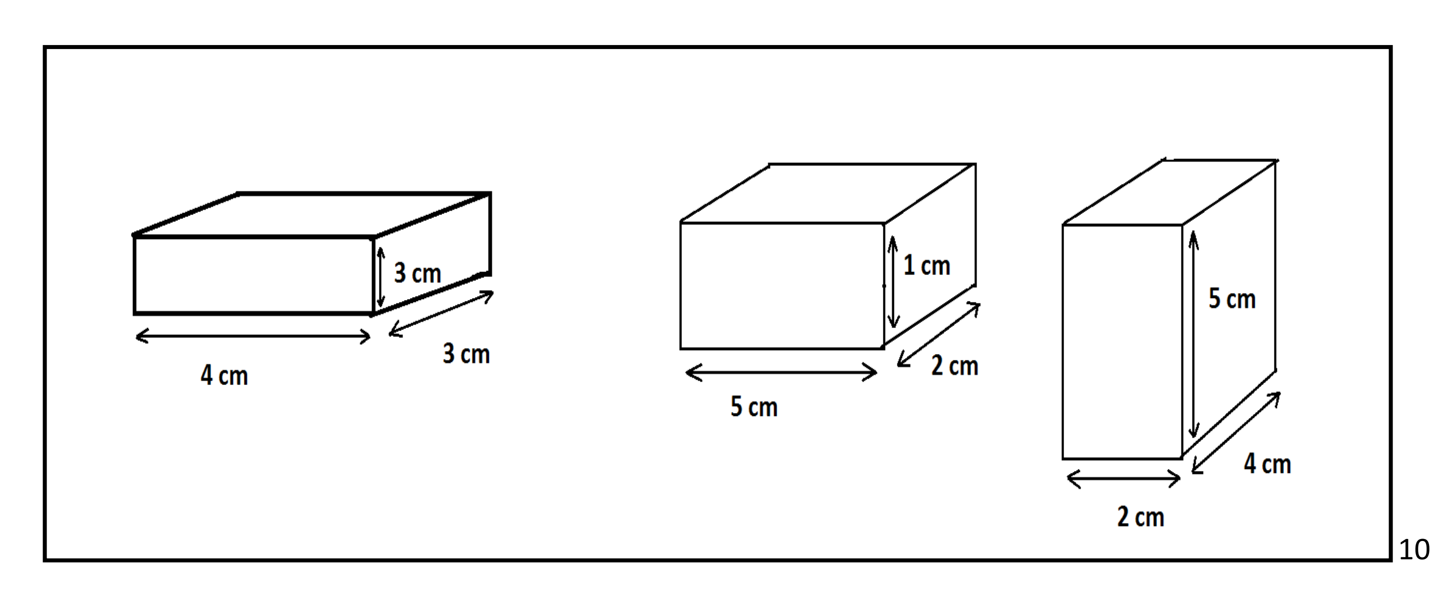


1. The volume of this box:

…………………………………………….

…………………………………………….

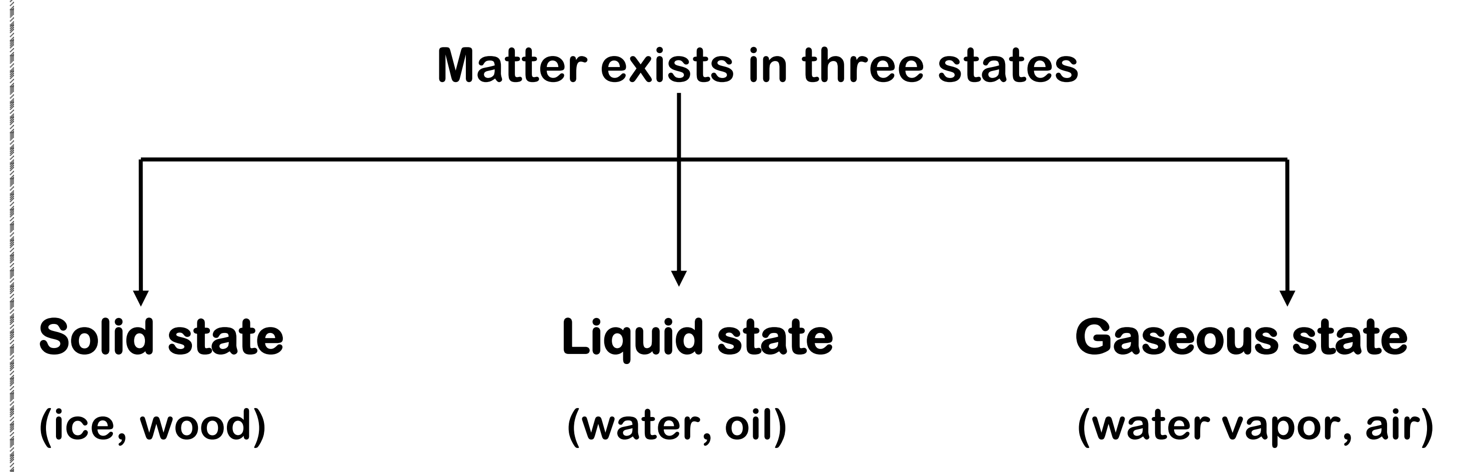
2. The following objects are made up of iron which of them has the least mass and volume.



Lesson 2: States of Matter and Their Changes

- Materials differ from each other in their matter state.
- The matter could found in one state or more and can be changed such as:
  - The change of ice into water and the change of water into water vapor
- Each matter state has its physical properties which are different from those of other states.

States of matter:



Properties of the three states of matter:

①Solid state:

- Solids have definite shapes and definite volume.
- Solids materials are rigid (hard).
- EX.: Ice , wood and gold



②Liquid state:



- Liquids have definite volumes and indefinite shapes.
- Liquids take the shape of their containers.
- EX.: Water, oil, milk and alcohol.

③Gaseous state:

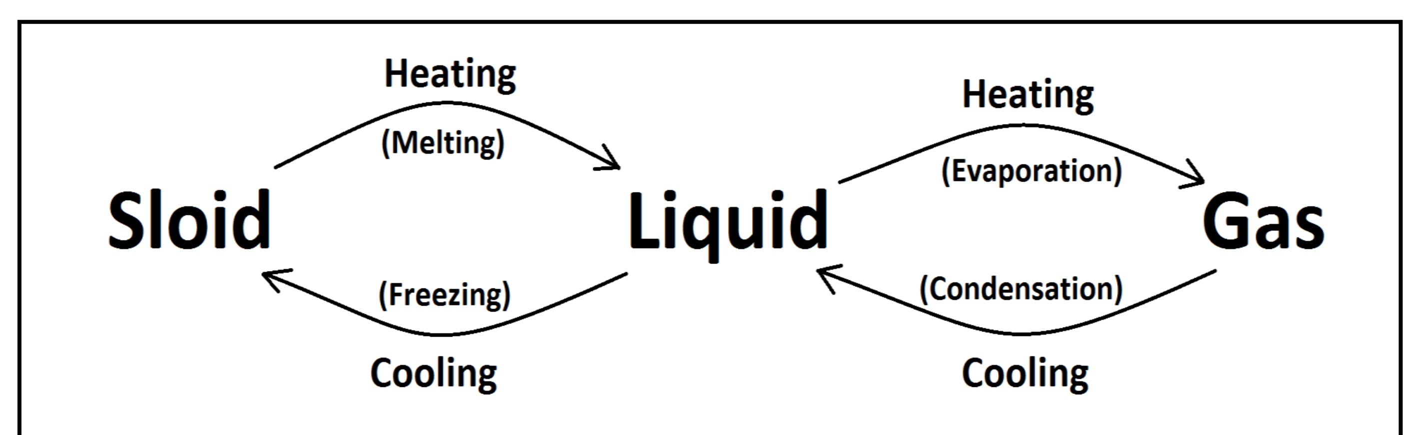
- Gases have indefinite shapes and indefinite volumes.
- Gases take the shape and the volume of their containers.
- Ex.: Water vapor, nitrogen and air.

Note:

The gaseous state can be compressed because the shape and the volume of gases can be changed by changing their container.

Changing of matter states

Matter changes from one state to another by heating or cooling.



❶Melting:

- **It is the change of matter from the solid state to the liquid state by *heating*.**
- **Ex.: Changing of ice into water.**

❷Evaporation:

- **It is the change of matter from the liquid state to the gaseous state by *heating*.**
- **Ex.: Changing of water into water vapor.**

❸Condensation:

- **It is the change of matter from gaseous state to the liquid state by *cooling*.**
- **Ex.: water droplets are formed on the cover of cooking pots during cooking.**

❹Freezing:

- **It is the change of matter from liquid state to solid state by *cooling*.**
- **Ex.: Changing of water into ice.**

Worksheet

Q.(1): Complete:

1. Matter can be pressed in case of its …………………state.
2. States of matter are ……………, ………………and ……………..
3. The only matter state that has definite shape and volume is ……………..state.
4. Evaporation is changing of matter from ……………..state to ………………..state by ………………

Q.(2): Choose:

1. Changing the matter from liquid state to solid state accompanied with …………………….
   (an increase of heat - decreasing in heat - stability of heat)
2. On decreasing the temperature of water vapor it ………………….
   (melts - freezes - condenses)
3. Water vapor is an example of ……………..state.
   (solid - liquid - gas)
4. Changing the matter from solid state into liquid state is called ………………
   (melting - freezing - condensation)

Q.(3): What will happen when:

1. Increasing the temperature of wax or ice.
   …………………………………………………………………………
2. We put a completely full bottle of water in the freezer.
   …………………………………………………………………………
3. Boiling some water and exposing the product to a cold surface.
   …………………………………………………………………………

Q.(4): Give reasons:

1. Formation of clouds in the sky.

   ....
2. If you get out a bottle of water from the fridge and leave it in the air, water drops are formed on its outer surface.

   ....

Q.(5): Put (√) or (X):

1. Changing the matter from gaseous state to liquid state is called condensation. (   )
2. Solids have indefinite shapes and volume. (   )
3. Melting is changing the matter from solid state to liquid state. ( )

Q.(6): Write the scientific term:

1. The only state of matter that has indefinite shape and volume. (...............................)
2. The processes of changing cube of ice into water by heating. (...............................)
3. Changing the matter from liquid state into gaseous state. (...............................)
4. The state of matter that can take the shape of the container but its volume doesn't change. (...............................)



Home work

Q.(1): Choose:

1. The changing of water from liquid state to gaseous state is called …………………
   (evaporation - condensation - melting)
2. Changing the matter from liquid state to solid state accompanied with ……………………
   (an increase of heat - decreasing in heat - stability of heat)
3. Changing the matter from solid state into liquid state is called ………………
   (melting - freezing - condensation)
4. Wood is an example of ……………state.
   (solid - liquid - gas)

Q.(2): Put (√) or (X):

1. Liquid can change into solid by cooling. ( )
2. Formation of clouds is due to the water vapor condensation. ( )
3. Gas can change into liquid by heating. ( )

Q.(3): Complete:

1. Changing the matter from liquid state to solid state can be done
2. The only matter state that has definite shape and volume is
3. States of matter are ……………., ……………..and ……………..

Q.(4): from the opposite figure:

1. Which number represents the liquid state?……..
2. Which number represents the solid state?………
3. How can number (2) change to number (3).
   ………………………………………………………
4. How can number (1) change to number(2).
   ………………………………………………………

cube of ice
(1)
(2)
water vapor
(3)
water

Lesson 3: Elements around us

In our daily life, we use many things such as cooking pots, cars and electric wires which are made of different materials known as elements.

So, what is the element?

Element:

It is the simplest pure form of matter that can't be decomposed into two substances or more.

Where,

- ***Matter*** **is consists of** ***Molecules*** **which are consists of** ***Atoms*****.**
- **The element is consists of smaller particles known as molecules, which also consists of atoms.**
- **An element contains one type of atoms which is different from atoms of other elements.**
- **Scientists discovered** ***118*** **elements until now and classify them into** ***92*** **elements found in nature and** ***26*** **artificial elements.**

Elements classification:

Elements are classified into:

- **Metals**
  - **solids**: Copper, Iron, Aluminium, Gold, Silver
  - **Liquids**: Mercury
- **Non-metals**
  - **Solids**: Carbon, Sulphur, Phosphorus
  - **Liquids**: Bromine
  - **Gases**: Oxygen, Nitrogen

Note:

The only liquid metal is mercury, while the only liquid non-metal is bromine.





Properties of elements:

Properties	Metals	Non-metals
1.Metallic luster	They have metallic luster (shiny) Ex.: Iron, copper and gold.	They don't have metallic luster (not shiny) Ex.: Coal
2.Electric conductivity.	They are good conductors of electricity. Ex.: Coin and metallic fork	They are bad conductors of electricity except "carbon". Ex.: A piece of sulphur
3.Heat conductivity	They are good conductors of heat. Ex.: Iron and copper.	They are bad conductors of heat. Ex.: Wax and carbon.
4.Melting point	They have high melting point.	They have low melting point.
5.Malleability	They are malleable and ductile which means they can bent and reshaped.	They are not malleable or ductile (they can't be bent or reshaped)

Some uses of Metals and Non-metals:

1. **Iron (metal):**
   It is used in manufacturing of car frames, bridges, doors and lamp posts ***because*** it is malleable.

2. **Aluminum (metal):**
   It is used in manufacturing of door knobs, cooking pots and foil ***because*** it is good conductor of heat and it is malleable.

3. **Copper (metal):**
   It is used in manufacturing of statues, coins and electric wires ***because*** it is malleable and good conductor of electricity.

4. **<u>Gold and Silver (metals):</u>**
   They are used in manufacturing of jewels because they have metallic luster and they are malleable.

5. **<u>Carbon (graphite) (non-metal):</u>**
   It is used in manufacturing of positive poles of dry cells (batteries) because it is a good conductor of electricity.

Worksheet

Q.(1): Choose:

1. An example of metal is ....
   (sulphur - copper - gold)
2. status are made up of ....
   (carbon - copper - sulphur)
3. An example of non-metal is ....
   (sulphur - copper - aluminium)
4. Iron is used to make ....
   (jewels - bridges - batteries)
5. The cooking pots are made up of ....
   (wood - graphite - aluminum)
6. Electric wires are made up of ....
   (copper - carbon - sulphur)
7. From non-metals which found in liquid at room temperature is ....
   (carbon - bromine - phosphorus)
8. Gold and silver are used in making ....
   (bridges - planes - jewels)

Q.(2): Cross the odd words:

1. Carbon - Bromine - Phosphorus - Sulphur.
2. Aluminium - Iron - Mercury - Copper.

Q.(3): Complete:

1. Copper is a good conductor of ....
2. All the materials around you are made up of ....
3. The group of elements that have luster are called ....
4. Silver is ....element while sulphur is ....element.

5. ……………is a non-metal element, while ……………is a metal element.

Q.(4): Give reasons:

1. Copper is used to make the electric wires.
   ………………………………………………………………………………
2. The poles of the dry cell are made up of graphite.
   ………………………………………………………………………………
3. Iron is used in making bridges.
   ………………………………………………………………………………

Q.(5): write the scientific term:

1. A group of elements which have no luster and bad conductors of electricity. (……………………….)
2. The simplest form of matter that can't be decomposed into two substances or more. (……………………….)
3. A group of elements which have luster and good conductors of electricity. (……………………….)

Home work

Q.(1): Complete:

1. **Poles of electric cells are made up of ……………….**
2. **Copper is a good conductor of ……………..**
3. **All metals are solid in the normal temperature except ………….is a liquid metal.**

Q.(2): Cross the odd words:

1. **Bromine - Iron - Phosphorus - Sulphur.**

Q.(3): What will happen when:

1. **We use sulphur to make electric wires.**
   …………………………………………………………………………………

Q.(4): Compare between:

1. **Metal and non-metal**

Lesson 4: Physical and Chemical Changes

If you have two papers, cut the first piece and burn the second one, you will observe the difference between the two types of changes.

- **What is the difference between the physical and chemical changes?**
  - **The change in the first paper is a change in the shape only. So we call it *"Physical change".***
  - **The change in the second paper is a change in shape and structure. So, we call it *"Chemical Change".***

①Physical Change: (reversible which means can return back)

- **It is a change in the shape (appearance) of matter without any change in its structure.**

Ex.:

1. **The ice cycle.**
2. **Melting of wax or chocolate.**
3. **Grinding of sugar or chalk.**
4. **Dissolving of table salt or sugar in water.**
5. **Bending (ducting) of metal.**

Note:

Melting, evaporation, condensation and freezing are considered physical changes.

②Chemical change: (irreversible)

- It is a change in the shape and the structure of matter producing a new substance with different properties.

Ex.:

1. Burning of wood, sugar, paper or any burning.
2. Adding yeast to dough as in bread.
3. Iron rusting.
4. Rottenness of fruits.
5. Production of yoghurt.

Note:

Digestion of food is considered a chemical change.



Worksheet

Q.(1): Complete:

1. The chemical change is a change in ……………and ……………
2. Formation of a layer of iron oxide on a piece of iron is considered a ……………….change.
3. Physical change is a change in the …………..only.
4. Dissolving of sugar in water is a …………….change, while iron rusting is a ……………change.
5. Ductility of copper into wires is considered ……………….change.

Q.(2): Choose:

1. …………….is an example of physical change.
   (burning of candle - iron rusting - dissolving sugar in water)
2. All of the following are chemical change except ………………
   (fireworks - burning of coal - formation of a salty solution)
3. Putting a bottle of water in the freezer for 24 hours causes ……………….to water.
   (physical change - change in the structure - chemical change)
4. As example for chemical change …………………
   (dissolving of salt in water - cutting paper - iron rusting)

Q.(3): Put (√) or (X):

1. Chemical change is a change in the shape and structure of the substance. ( )
2. Hammering of iron is considered a chemical change. ( )
3. Rising up the temperature of a piece of wax is considered a physical change. ( )
4. Iron rusting is a physical change. ( )

Home work

Q.(1): Classify into physical or chemical change:

1. Grinding of sugar or chalk.
2. Adding yeast to dough as in bread.
3. Production of yoghurt.
4. Dissolving of table salt or sugar in water.
5. Bending (ducting) of metal.
6. Burning of wood, sugar, paper or any burning.

Physical change	Chemical change
....	....

Q.(2): Complete:

1. Rotten of fruits is considered ....change.
2. Melting of ice in the two poles is a ....change.
3. Boiling of water and changing it into water vapor is ....change of matter.
4. Evaporation of water is considered as ....change.

Q.(3): Write the scientific term:

1. The change in the shape of the matter only not in the structure. (..............................)
2. The change in the shape and structure of the matter. (..............................)
3. A layer of iron oxide forms on a piece of iron. (........................)

Q.(4): Choose:

1. **Adding yeast in baking is considered a ……………….**
   (physical change - chemical change - change in the appearance)
2. **Adding table salt to water and stirring produces ………………**
   (physical change - chemical change - new substance)
3. **As example for physical changes …………………..**
   (burning of sugar - melting of ice - burning of wax)

Unit 2

Lesson 1 : Stars and planets

Star:

They are lightning bodies with different sizes that lie in the space.

Characteristics of stars:

1. **They are lightning celestial bodies that rotate in the space.**
2. **They have different sizes.**
3. **They emit heat and light.**

Note:

The big stars look very small to us because they are far away from us.

The solar system consists of:

①The sun:

- **It is a star because it emits heat and light.**
- **It lies in the center of the solar system.**
- **It is the biggest body in the solar system.**
- **It is a medium-sized star but it looks the biggest to us because it is the nearest star to us.**

②The eight planets:

Planets:

They are dark bodies that revolve around the sun in fixed orbit.

The arrangement of planets:

1. **According to their distances from the sun: (from the nearest to the farthest)**
   Mercury – Venus – Earth – Mars – Jupiter – Saturn – Uranus – Neptune
2. **According to their sizes: (from the biggest to the smallest)**
   Jupiter – Saturn – Uranus – Neptune – Earth – Venus – Mars – Mercury

The characters of the planets:

1. ***Mercury:*** **the nearest planet to the sun.**
2. ***Venus:*** **the most beautiful planet.**
3. ***Earth:*** **the planet where we live and it is a watery planet because water occupies most of it.**
4. ***Mars:*** **The red planet because its rocks contain iron.**
5. ***Jupiter:*** **the biggest planet.**
6. ***Saturn:*** **The planet which has colored rings rotating around it.**
7. ***Uranus:*** **the coldest planet.**
8. ***Neptune:*** **the blue planet.**

③Moons:

- **Moons are the followers of some planets and they revolve around them.**
- **The moon revolves around the earth and it is the nearest neighbors to us in space.**

So,

The moon:

It is a dark body revolves around the earth and reflects the sun light falling on its surface so it seems shiny.

④Other celestial bodies:

They are bodies floating in the space like comets, asteroids, meteoroids and meteors.

Worksheet

Q.(1): Give reasons:

1. The stars seem very small in size.
   ……………………………………………………………………………………….
2. Planets are dark bodies but we see it shining.
   ……………………………………………………………………………………….
3. Although the moon is a dark body, we see it shining.
   ……………………………………………………………………………………..

Q.(2):Complete:

1. Bodies that emit light and heat are called ………………..
2. Mars is known as ……………..while Neptune is the ………………planet.
3. The biggest planet in the solar system is ………………..
4. The solar system consists of the …………….and …………planets rotating around it.
5. The central body of the solar system is …………………

Q.(3): Choose:

1. It is the biggest body in the solar system is the ……………..
   (Sun - Earth - moon)
2. According to planets size, ………………is the smallest planet.
   (Mars - moon - Mercury)
3. The sun is a star because ………………
   (it reflects light - it emits light - it let the light pass through)
4. The most beautiful planet is ………………
   (Venus - Earth - Neptune)

Q.(4): Arrange the following planets from the smallest to the biggest:

Earth - Jupiter - Mars - Neptune - Mercury

Home work

Q.(1): Write the scientific term:

1. Dark bodies revolve around the sun in fixed orbits. (……………….)
2. The centre of the solar system. (…………………….)
3. One of the solar system planets which has a colored rings around it. (……………………)
4. Dark body rotates around the earth and reflects the sun light. (…………………..)

Q.(2):Complete:

1. The only star in our solar system is ………………….
2. The Earth is located between…………….and ……………..
3. Bodies that emit light and heat are called ………………..
4. Planets are ………………bodies while stars are ……………bodies.
5. The number of planets that rotate around the sun is ……………

Q.(3): Cross the odd word out:

Earth, Mars, Moon, Jupiter

Lesson 2: Motion of the Sun and Earth

All the celestial bodies are floating in the space in a continuous motion as:

1. **The motion of the sun:**
2. **The motion of the Earth.**
3. **The motion of the moon.**

①the rotation of the sun: (apparent movement)

We see the sun rises in the east and sets in the west, thus it seems moving from the east to the west.

But,

This is not true. In fact this is not due to the rotation of the sun but due to the rotation of the earth around itself (its axis) where this phenomenon is called "Apparent Movement of The Sun".

②The motion of the earth:

There are two types of motion of the Earth.

1. **Rotation of the Earth around itself (its axis)**
2. **Rotation of the Earth around the sun.**

❶Rotation of the Earth around itself:

The earth consists of two hemispheres which are:

- **Northern hemisphere (where Egypt lies)**
- **Southern hemisphere.**

The earth rotates around itself (its inclines axis) once every 24 hours (one day).

Notes:

- **The side of the earth that faces the sun during this rotation becomes bright on day, while its other side becomes dark on night.**
- **The sequence of day and night occurs due to the rotation of the earth around its axis.**
- **The hours of day are not equal to the hours of night because the axis of the earth is inclined.**

How to determine the length of the day and night:

1) **Read the sun set = Time of sun set (H:m) + 12 hours (12:00)**

Then,

2) **The length of day = Read of sun set (H:m) – read of sun rise (H:m)**

So,

3) **The length of night = 24 hours (24:00) – length of day (H: m)**

Example:

Calculate the day hours and night hours from the following table:

Day	Time of sunrise	Time of sun set
21^{st} January	Hours : minutes 6 : 43	Hours : minutes 5 : 43

Solution:

1) **Read of sun set = time of sun set + 12 hours**
   Read of sun set = 5 : 43
   + 12 : 00
   17 : 43

2) The length of day = read of sun set – read of sunrise

The length of the day = 17 : 43

$$\begin{array}{r} 17:43 \\ -\ 6:43 \\ \hline 11:00 \end{array}$$

3) The length of night = 24 hours – length of day

$$\begin{array}{r} = \ 24:00 \\ -\ 11:00 \\ \hline 13:00 \end{array}$$

❶Rotation of the Earth around the

The earth rotates around the sun once every 365 $\frac{1}{4}$ day.

The rotation of the earth around the sun causes the sequence of the four seasons (summer – autumn – winter – spring)

<u>Note:</u>

In summer: hours of the day are longer than hours of the night.

In autumn: hours of the day are equal to the hours of night.

In spring: hours of the day are equal to the hours of night.

In winter: hours of the day are shorter than the hours of the night.

<u>Give reasons:</u>

Day in summer seasons is longer than a day in winter season.

Ans.: Because the earth's axis is inclined.

Worksheet

Q.(1): Complete:

1. **The moon complete its rotation in about …………days, while the Earth complete its rotation around the sun in ………….days.**
2. **The phenomena of …………….sequence results from the rotation of the earth around its axis, while the sequence of ……………..results from the revolution of the earth around the sun.**
3. **The earth's axis is inclined causing the difference between ……………and……………..**

Q.(2):Give reasons:

1. **The sequence of day and night.**
   ……………………………………………………………………………….
2. **The sequence of four reasons.**
   ……………………………………………………………………………….

Q.(3): From the following table:

days	Time of sun rise		Time of sun set	
	Hours	minute	Hours	minute
Day (1)	6	10	**5**	**12**
Day (2)	5	20	**6**	**53**

1. **Calculate the day hours in each day.**
   ………………………………………………………………………………
   ………………………………………………………………………………
2. **Write the name of the suitable season for each day.**
   Day (1) ……………………….
   Day (2) ……………………….

Home work

Q.(1): From the following table:

days	Time of sun rise		Time of sun set	
	Hours	minute	Hours	minute
Day (1)	5	55	5	32
Day (2)	5	43	6	46

1. Calculate the day hours in each day.
   …………………………………………………………………………………
   …………………………………………………………………………………
2. Write the name of the suitable season for each day.
   Day (1) ……………………….
   Day (2) ……………………….

Q.(2): Complete:

1. Day time is longer than night in ……………..season.
2. In ……………and ……………. Day time is equal to night time.
3. Night time is longer than day time in ………………

